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FINANCIAL MARKETS AND THE CAPITAL STRUCTURE OF MANUFACTURING ENTERPRISES IN GHANA

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ABSTRACT

The focus of this study is the financial market and the capital structure of non-farm manufacturing enterprises in Ghana. A review of the banking industry and the non-bank financial institutions in the country is presented to document the structure of the formal financial sector. More importantly, the study examined the significance of different sources of financing, internal and external, in the capital structure of the firm and the factors explaining entrepreneurial behavior in using different financial contracts. The capital structure was modeled by considering a one-period world within a deterministic approach. A set of testable hypotheses derived from this model was applied to a sample of 175 micro, small and medium scale manufacturing enterprises in Ghana. The findings of this study support the hypotheses that the characteristics of the enterprise, attributes of the entrepreneur, rates of return, interest rates, transaction costs of alternative sources of financing and the respective shares of these securities simultaneously determine the capital structure of the enterprise.

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I. Introduction

Despite numerous projects and policies initiated to assist micro, small and medium scale manufacturing enterprises (SMEs)[1] in low income countries (LICs), little is known about the impact these efforts have on enterprise operations and growth. The design of microenteprise programs continues to be among the priorities of many donors and policy makers concerned with securing financial and non-financial services for microentrepreneurs in low income countries. The persistent question, however, is to what extent do credit programs assist the operations and evolution of SMEs? The supply leading approach to the development of SMEs has led researchers to be wary of its consequences (Adams and Von Pischke). Enterprise development programs typically provide loans and/or technical assistance but neglect to assess the entrepreneur's effective demand for alternative financial services. Most of the literature that describes the sources of finance for this clientele in low income countries is based on a descriptive rather than a diagnostic framework (e.g. Aryeetey et. al.; Cortes, Berry and Ishaq; Levy; McLeod; Kilby, Liedholm and Meyer). This problem persists because there is a lack of understanding and recognition of the unexplored issue of the capital structure of these enterprises.

Typically, analysts divide the supply of working capital for firms into internal and external sources when describing how micro and small scale entrepreneurs finance their operations, such as in a study of the small scale enterprise sector in Sierra Leone (Kilby, Liedholm and Meyer). The first source of internal finance includes personal savings, gifts and informal loans from friends and family, while retained earnings, the second source, was reported the primary source for expansion. External sources of finance for short-term credit include customers, suppliers, commercial banks and the curb market. The suggested rank order of importance is, first, customer advance payments, second, accounts payable to suppliers, third, loans from commercial banks and, last, interest bearing informal loans such as those provided by moneylenders. The suggested reasons for this rank order include cost and information advantages when choosing internal versus external sources.

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[1] The definition of micro, small and medium scale enterprises based on the number of employees varies in the literature (Liedholm and Parker). Some of these variations are a result of subjectivity as well as country specification. SME is used as a generic reference to micro, small and medium scale enterprises in this study.

The frequent identification of finance as the primary obstacle for developing small scale enterprises is based on fairly weak methodology when the source of data used is based on the entrepreneurs' own subjective responses (e.g. Levy). When asked about their access to formal finance, entrepreneurs typically respond by arguing that they have a need for credit at reasonable prices when the real problem may reside in the high cost of inputs, inefficient technology or weak market outlets. A critical problem in the assessment of these small enterprise studies is that they consider formal financial contracts that entrepreneurs use as being exogenously predetermined, and not an endogenous function of the overall mix of financial services available to entrepreneurs in the particular sub-sectors within which they operate.

The focus of this study is the capital structure of non-farm manufacturing enterprises in low income countries. The examination of the entrepreneur's choice among the sources of financing, internal and external, will shed some light on firm level operations in financial markets. This study draws upon the modern theory of finance where the issue of the capital structure of firms is discussed within two schools of thought, the optimal leverage theory and the pecking order theory. Both frameworks address the determinants of capital structure within developed financial markets. It is critical, however, that we recognize the conditions of embryonic financial markets prevailing in many LICs. Thus, the study presents a model addressing the capital structure of enterprises in developing economies, derives a set of testable hypotheses and presents empirical implications based on a study of the enterprise sector in Ghana.

Ghana is a revealing country in which to conduct this research. The Economic Recovery Program (ERP), initiated in the mid 1980s in Ghana, has been judged among the most successful structural adjustment programs in Sub-Saharan Africa (Leechor). Policy reforms have encouraged private sector development. However, despite interest rate liberalization, a decline in high reserve requirements, reduction of inflation, trade and exchange rate reforms, and deregulation of input and output markets, there are continuing problems of financial deepening with only a modest rise in M2/GDP up to the early 1990s (Table 1, panel A). Formal financial institutions play at best only a modest role in the provision of financial services to the private sector (Baydas and Graham). Rather than mobilizing savings and intermediating between deficit and surplus units in the private sector, commercial banks invest a large share of their liabilities in secure government treasury-bills (t-bills). There is little domestic credit flowing to the private sector, hence it is important to analyze how micro, small and medium scale manufacturing enterprises manage to finance their operations.

The following section reviews the capital structure determinants in developed and developing countries. Section three describes the financial markets in Ghana. Section four presents the theoretical framework used to analyze the determinants of the capital structure of non-farm manufacturing enterprises in LICs. Section five explains the enterprise survey conducted in Ghana and the data used in the study. Section six reviews the econometric methods and the results of the model. Finally, the last section draws together the summary and conclusions.

II. Capital Structure Determinants in Developed and Developing Capital Markets

The theory of optimal capital structure proposes that the firm's optimal debt to asset ratio is that which minimizes the firm's composite cost of capital (Wijst). In addition to the direct costs of borrowing, the indirect costs of borrowing have been associated with taxes, bankruptcy costs, agency costs and signalling effects (Harris and Raviv). Many of the hypothetical assumptions upon which these models are based include costless, competitive and complete capital markets (Stiglitz; Wijst). These assumptions imply that there are no transactions costs, there is complete information and financial assets are costlessly and infinitely divisible. The reasoning behind these assumptions, based upon developed countries' capital markets, does not hold in developing country capital markets. The pecking order theory, however, does not assume a perfect capital market structure but rather underscores some important imperfections in financial markets such as asymmetric information and transaction costs as well as the costs of financial distress.

The pecking order theory is not concerned with an optimal debt level of the firm (Myers). Financing decisions, in addition to cost considerations, are influenced by control and disclosure factors. Many asymmetric information problems, such as adverse selection and moral hazard, which result in signalling effects and agency costs induce additional costs when using external sources of finance. This implies that firms are inclined to use a sequential rank order in their choice for sources of finance. "Safety first" (i.e. not losing ownership control of the firm) is a principle that has been used to rank the preferred sources of financing that the firm draws upon in priority order (Cuevas; Myers). It is argued that firms choose to finance investments first from internally generated funds since this represents the safest source of financing. External sources of financing, therefore, are ranked second. In the case where external finance is required the safest sources are also drawn upon first. External finance may be divided into informal and formal sources. Informal sources include loans from relatives and friends, investments by relatives and friends, and trade credit from both suppliers and customers. Formal sources are further divided into financial intermediaries and public capital markets. Financial intermediaries include bank and non-bank financial institutions as well as venture capital companies. Public markets consist of bond issues and stock issues. These public market sources, however, are less frequently available in developing country capital markets. The following section clarifies this issue by providing an overview of the financial markets in Ghana detailing the available options to entrepreneurs.

III. Financial Markets in Ghana

1. The Banking Industry in Ghana

The financial sector in Ghana was liberalized from 1988 onwards, approximately five years after the initial launching of the structural adjustment program in the country (Leechor). These market deregulation and institutional restructuring efforts were intimately linked to simultaneous exchange rate reforms and the introduction of a short term treasury bill market that permitted the growth of open market operations of government securities to control the money supply (Table

1). Credible exchange rate reforms reduced capital flight which in turn strengthened the attractiveness of holding short term government securities. The removal of interest rate ceilings allowed these new instruments to be priced at an attractive rate. Finally the introduction of this indirect instrument to control the money supply brought inflation under control thereby reinforcing the exchange rate reforms and export growth. However, the rapid growth of the t-bill market has induced a crowding out effect on the loan market as seen in the marked decline in the loan to deposit and loan to asset ratios and an equally marked rise in the investment (i.e. t-bill) to asset ratios of private banks in the country (Table 1, panel B).

The banking sector in Ghana consists of four large commercial banks; three secondary commercial banks; three merchant banks; three development banks, and one cooperative bank. At the same time there are 123 small unit banks in rural areas and 300 credit unions. There are no private indigenous banking institutions with a majority Ghanian capital base except for the small rural banks. The large scale banking industry is divided between private international banks and public sector banks (Baydas and Graham).

The public sector Ghana Commercial Bank in 1993 continued to dominate the banking sector with 50 percent of total sector assets and 54 percent of the total deposit base. The industrial sector receives by far the largest share of total loans and advances in the banking sector. Curiously as the share of industrial sector loans grew in the banking industry up to 1990, the industrial sector share of GDP remained unchanged raising some questions about the efficiency of industrial sector loans in the economy during the mid-to-late 1980s (Baydas and Graham).

The banking industry reflects some degree of specialization with the ADB (Agricultural Development Bank) heavily into agricultural loans, the SSB (Social Security Bank) into construction and housing; and merchant banks with a strong foreign trade clientele. Merchant banks of course largely deal with corporate customers while large commercial banks like Barclays, Standard Chartered and the Ghana Commercial Bank incorporate retail banking services to individual customers through large branch networks. Bank lending can also be specialized into largely short term overdraft facilities (e.g. the merchant banks and the large commercial banks) or term loans (the ADB). Finally banks can, to some extent, be characterized through their deposit facilities with higher interest bearing time deposits and certificates of deposit standing out in merchant and private commercial banks and lower interest savings deposits more common in public sector banks (Baydas and Graham).

As mentioned earlier the performance of Ghana's financial markets was not impressive in the 1980s in large part due to the delay in implementing financial deregulation and bank restructuring and due to continuing inflation. Negative real rates of interest for both lending and deposits up to the early 1990s underscores the fact that savers were subsidizing borrowers. This further implies that the unreformed financial markets of the 1980s generated a regressive redistribution of income from lower income depositor-savers to higher income borrowers. Although by the time that financial deregulation was carried out real lending and deposit rates both turned positive (post 1991) and the gross margin of financial intermediation reached 13 to 14 percentage

points. The loan market only represented between 8 and 40 percent of total bank assets in the banking industry in 1993 with non-loan treasury bills and foreign trade finance predominating in most bank assets. In this immediate post-adjustment environment, local enterprises would not find the local banking setor a promising source of financial services.

2. Non-bank Financial Institutions and Programs in Ghana

Non-bank financial institutions in Ghana are quite new. The stock market that currently lists about 15 companies was recently established in 1991. There is minimal trading of stocks, thus, the issuing of equity is not a very feasible option to most entrepreneurs. Non-bank financial institutions and programs in Ghana can be classified under three categories. First, are institutions that have or are acquiring licenses as non-bank financial intermediaries, subject to the "Financial Institutions Non-Banking Law" of January 1993. The recently established discount companies, leasing companies, a venture capital firm and two savings and loans companies fall in this category. The leasing companies and the venture capital firm have only recently begun operations and have few clients.

Among the NBFIs that try to work with micro and small scale enterprises are two savings and loans companies. The first is the City Savings and Loans Company (CS&L) that was established in 1992 as a deposit taking non-bank financial institution. The CS&L objective is to extend financial services to microentrepreneurs, especially market women, who operate in the markets of greater Accra. The CS&L grants performance-based "character" loans to their market women clientele who lack collateral assets. As of December 15, 1993, the total number of clients consisted of 1,032 depositors and 61 borrowers. The second savings and loan association is the Women's World Banking Ghana Mutual Assistance Susu limited (WWBG-MASU) established in 1991 to mobilize savings and offer credit directly. WWBG-MASU offers financial services similar to the mechanism of the Rotating Savings and Credit Associations or Susu groups. That is, clients have to participate as both savers and borrowers. A potential borrower would have to save a fixed amount consistently for at least six months prior to applying for a loan. Loans are typically equal to twice the amounts saved, which are held as security. Loans are granted for periods ranging between six to twelve months. The maximum amount of a single loan is 1.5 million cedis and interest rates on loans range between 20 and 25 percent. There are currently about 300 borrowers and 2500 depositors with WWBG-MASU. Clearly, these NBFIs are still at their early stages of development and have not reached any notable scale that would constitute a marked source of finance for entrepreneurs.

The second type of non-bank financial institution is the government enterprise program of the National Board of Small Scale Industries (NBSSI) that provides direct financial services, mainly loans, as well as non-financial assistance to micro and small scale enterprises. The NBSSI established in 1981 to implement policies and programs to assist in the creation and development of small scale industries in Ghana. These programs until 1991 focused on providing non-financial assistance, such as training, information dissemination, business consultancy and extension services. In 1991, the Ghanaian Enterprises Development Commission (GEDC)—a small scale

enterprise loan program—was merged with the NBSSI. The provision of financial services, therefore, became one of the major components of the portfolio of the NBSSI.

Currently the NBSSI administers three credit schemes with different funding sources and program requirements. The two principal programs have been provisioned by donors, the Program of Action to Mitigate the Social Cost of Adjustment (PAMSCAD) and Enhancing Opportunities for Women in Development (ENOWID). The third program, the Revolving Fund for small scale enterprises, is a government scheme. The size of these funds differ as do the terms and conditions associated with the loans made under these programs.

The most recent and smallest facility is the Revolving Fund. This facility was established in 1993 with seed money of 80 million cedis, out of which 51 million cedis have been disbursed to 26 individual entrepreneurs and three associations. Loans granted under this scheme are on average about 1 million cedis (i.e. US$1075), the credit ceiling is 1.5 million cedis per loan to individuals but loans to associations can be larger. Loans are given, at about 19 percent interest, (with inflation in 1993 at 13 percent) for one to a few months with only a co-signer guarantee. The program is having difficulty with a reported default rate about 35 percent.

The ENOWID program was established in 1991 and has disbursed to-date about 286 million cedis. This program has reached a total of 3,525 women since its inception with average group member loans of about 81,147 cedis (i.e. US$87). These loans are issued at a 20 percent interest rate for a standard period of eight months. Some groups have successfully applied for loans two to three times. The recovery rate has been remarkably better than the other two schemes. According to the NBSSI records there is only about a five percent default for loans in this program. No cost information was available to determine the financial viability of the program for "sustained" enterprise finance.

The PAMSCAD facility was established in 1989 under the GEDC and was transferred to the NBSSI upon the merger of the two institutions. A total of 300 million cedis were reported to have been disbursed under this facility to about 700 beneficiaries, both men and women, 57 percent and 43 percent respectively. This program has a credit ceiling of 500,000 cedis per beneficiary. Some loans, however, exceed this limit. Overall, the average loan size under this scheme is about 392,561 cedis (i.e. US$422) issued at 20 percent interest rate for about 14 months. The recovery rate is relatively poor. There are about 80 million cedis in default as of December, 1993, which leaves an arrears rate of 35 percent.

To identify the factors explaining loan repayment, an analysis was carried out utilizing available information on loan and borrower characteristics for the PAMSCAD program (Baydas and Graham). Loan size, interest rate, term maturity and monthly installment rate were among the pertinent information available on loan characteristics. Gender, region and sector of operation were among the pertinent features of the borrower. The results of the analysis confirm expectations that loans issued for longer maturity periods, especially with large monthly installments and high interest rates, lack adequate screening of borrowers and, thus, are associated

with larger arrears. Moreover, female entrepreneurs register better loan repayment than male entrepreneurs. The institutional viability of the microenterprise program is largely dependent on loan recovery since its survival is linked to a revolving fund in which the only infusion of funds comes from loan repayments. The results reported here are not encouraging concerning the number of times these funds can revolve before they are exhausted. One strategy to deal with this would be to charge interest rates that would allow the program to break even and only make loans to customers with good repayment record.

Any financial institution or program must cover its total lending costs (administrative costs and the costs of funds) plus an allowance for bad debt, i.e. non-performing loans. Given the value of administrative costs (17 percent per unit) and the zero cost of funds, the risk premium is estimated to be 29 percent and total lending costs per cedis lent is estimated to be 46 percent (Baydas and Graham).[2] Admittedly no program or financial institution is charging an interest rate of 46 percent in Ghana today. The estimate nevertheless serves a useful purpose underscoring the financial consequences of a program whose default rate is 20 percent (i.e. highlighting the dramatic tradeoff between the default rate and the break-even interest rate). Put differently, the interest rates charged (20 percent) were little more than a token gesture to price loans and come nowhere close to covering the losses incurred inclusive of loan default. The default rate that would still allow the program to break even with a 20 percent total lending cost is about 2.5 percent.[3]

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[2] Estimates of the risk premium can be derived using the formula below:

$$r = [d/(1-d)]*(1+a+c)$$

where r = risk premium per dalasis lent; a = per unit administrative costs; c = per unit cost of funds; d = proportion of the portfolio in default (unrecoverable loans);

This measures the loss to the institution (program) brought on by the proportion of the portfolio that has fallen into default plus the administrative costs and deposit costs that were incurred in servicing these defaulted loans and are now permanently lost or irrecoverable. The premium that results from this estimation (r) is the rate that must be added to the institutions administrative and deposit costs to generate total lending costs. To highlight this relationship consider total lending costs as:

$$TLC = a + c + r$$

where TLC = total lending costs (per unit of dalasis lent) and a, c and r are as defined above. The estimation is as follows: a=0.17; c=0; d=0.20; so that r=[0.2/0.8]*[1.17]=0.29 and total lending costs on a per unit basis is TLC=(0.17)+(0)+(0.29)=0.46.

[3] The estimation of the default rate d is carried out by using the formulas for risk premium (r) and total lending cost (TLC). Given that TLC must be equal to 20 percent then TLC=0.2, with a=0.17 and c=0. Solving for (r) we get 0.03. Placing r=0.03 in the risk premium equation we get 0.03=[d/1-d](1+0.17+c); so that d=0.025.

A large permanent subsidy is necessary for the program to function. Moreover, the limited coverage of the program and its one-time loan philosophy limit its usefulness as a permenant financial intermediary entrepreneurs can use on a continous basis.

The third type of non-bank financial instituions are donor programs that provide assistance to the private sector. The World Bank Fund for Small and Medium Scale Enterprises (FUSMED) and the United States Agency for International Development, Trade and Investment Program (TIP) are the most active in private enterprise development. The World Bank provided a Fund for Small and Medium Enterprise Development (FUSMED) in Ghana in 1990. A total of 101 projects were financed through the FUSMED facility between 1990-1993 with eight banks participating in issuing program loans to their clients with this facility. A total of US$24m were disbursed with the bulk of the loans (US$22m) made to medium scale projects. In general, FUSMED projects were largely concentrated in the manufacturing sector. As of April 1994 at least one third of the projects with due payments were already in delinquency.

The United States Agency for International Development (USAID) has an US$80m project in Ghana associated with the Trade and Investment Program (TIP). This program, initiated in 1993, was designed to assist private sector non-traditional exports. The project addresses two principal constraints: 1) the enabling environment, i.e. the legal framework, transparency and the trade regime; and 2) the current production and marketing capability of existing and/or potential export firms. The TIP components are at various stages of implementation and collaboration with firms in the enterprise sector in Ghana. USAID, thus, is supporting small, medium and large scale entrepreneurs in the private sector directly and indirectly. Direct support is provided through the various programs under TIP where firms are the immediate beneficiaries of financial and non-financial assistance. Indirect support is provided through the changes in the macroeconomic and trade policies that are conducive to export promotion.

Three issues critical to the performance of bank and non-bank financial institutions are relevant. The first relates to the role of financial innovations in financing the enterprise sector, and particularly micro and small scale enterprises. The second addresses the sustainability of traditional supply leading microenterprise programs such as the NBSSI in Ghana. The third is the overall regulatory challenge that the government faces with the expansion of the non-bank financial sector. These critical issues and difficulties that non-bank financial institutions face in developing capital market environments in general, and in Ghana in particular, emphasize the nature of the financial services available to entrepreneurs. Moreover, these issues highlight the differences between developed and rudimentary capital markets in developing countries and the consequential costs and risks entrepreneurs have to bear in the Ghanian financial market.

IV. Data from the Enterprise Survey in Ghana

To examine the alternative financial networks in the manufacturing enterprise sector in Ghana a survey of 175 micro, small, medium and large scale manufacturing enterprises was

carried out in March and April of 1994. The surveyed enterprises were selected in Accra and in the peri-urban region of Accra which included the towns of Nsawam and Aburi. This dynamic area was chosen because it is the only region in the country in which one finds a large and diverse number of manufacturing enterprises across various sub-sectors and size categories that could provide information about the issues in question. The enterprise survey covered four sub-sectors in the manufacturing sector. These consisted of textile and tailoring establishments, furniture and wood processing enterprises, artisanal wood-crafts producers and food processing bakeries. Over 40 enterprises were surveyed in each sub-sector.

These enterprises were operated primarily by owners (89 percent) with an average value of physical assets of 255,927,000 (US$ 260,000). This value, however, varies substantially by sub-sector. The average number of employees in the surveyed enterprises was 25 persons; however, employees ranged from 0 to 2310 workers. Thus, the sample includes micro, small, medium and large scale enterprises that have been in operation on average for 11 years. The sources of funding and the savings channels entrepreneurs draw upon are various. They fall into informal and formal networks. The informal channels that were found to prevail in Ghana include family, friends, suppliers credit, customer advances, Susu groups (Rotating Credit and Savings Associations, or ROSCAs), and susu collectors. Although the formal financial sector is expanding in Ghana, formal channels reported to be used by the entrepreneurs only include commercial banks.[4]

Sources of finance for current operations are concentrated on informal agents (Table 2). First, most of the entrepreneurs (93 percent) operating in the four sub-sectors in Table 2 reported that they use retained earnings as a source of financing their current operations. Second, about 45 percent of the entrepreneurs in the four sub-sectors reported that they draw upon informal sources of finance from other enterprises, or family and friends in their current operations. Third, 49 percent of the entrepreneurs in the total sample reported using customer advances to finance their business operations. This channel of finance is very significant for furniture-wood processing and textile-tailoring manufacturers. Customer advances were a source of financing for 93 percent of the entrepreneurs operating furniture-wood processing enterprises and for 62 percent of the entrepreneurs operating textile-tailoring enterprises. Fourth, supplier credit is an important source of financing for most entrepreneurs. It was used by 65 percent of the total sample. It stands out in the case of bakeries where 83 percent reported frequent use of this source of finance in purchasing their input materials. The majority of the wood carvers (73 percent) also reported drawing on input supplier financing when purchasing their inputs. Roughly half of the furniture-wood processors and the textile-tailoring entrepreneurs (58 and 46 percent respectively) reported using supplier credit. In general, trade credit, which consists of customer advances and supplier credit, is used by the majority of the entrepreneurs (84 percent) in the sample. Fifth, and last, only 22

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[4] These observed channels that are drawn upon to fund enterprise activity are similar to those identified by Aryeetey et. al. in their study of the sources of finance entrepreneurs use in the enterprise sector in Ghana.

percent of the interviewed entrepreneurs have acquired formal finance for the purpose of operating their businesses.

Entrepreneurs in the sample were found to participate in different savings channels (Table 2). Formal channels consisted of accounts in commercial banks. The informal channels are represented by susu groups and susu collectors. Among the most common savings channels are the commercial banks. Roughly two thirds of the entrepreneurs in the three sub-sectors (all but bakeries) held at least one account with one of the commercial banks in the country. Susu groups are the second most widely used saving channel among the entrepreneurs in the sample. About 11 percent of the entrepreneurs reported participating in susu groups. The concentration of susu groups is largely among the microenterprises in the traditionally female dominated professions of tailoring and bakeries. Some groups, however, were found among the male dominated professions of wood carving and furniture manufacturing. A number of entrepreneurs participated in susu groups previously but had stopped due to encountering problems in the management of susu funds. Some of the reasons given for terminating membership included reports that payments were being delayed or lack of confidence in the susu leader. In the peri-urban towns the most characteristic channels for savings were deposit accounts with formal institutions, informal groups and susu collectors, while in urban Accra deposit accounts with formal institutions stands out.

The use of the alternative sources of finance seem to vary to some extent by size of the enterprise and the number of years the enterprise has been in operation (Tables 3 & 4). On the one hand, the size of the enterprise measured by the number of employees, including apprentices, indicates that while micro and small scale enterprises engage in informal holdings, medium and large scale enterprises do not participate in the susu informal groups or keep deposits with money-keepers. Medium and large scale enterprises, however, use more formal financial services on both the deposit and lending side, whereas micro and small scale enterprises use much less loans and less deposit services. Trade loans are used largely by all size categories. This underscores the complemetary nature of informal finance in Ghana. Although large firms increasingly acquire formal finance, they still use informal trade finance in their operations. This can also be seen by the stage of enterprise life measured in Table 4. Although informal loans from friends and family decline by age of operations, the continuing complementary role of trade finance continues playing an important role the older the firm as well as the larger the firm. Finally, it is apparent in both tables 3 and 4 that micro, small and younger firms, though not accessinguse formal financial channels, do enjoy alternative channels of working capital for their operations.

In summary, the sources of finance may be characterized in a rank order starting with the most to the least utilized. First is retained earnings as the overwhelming source; second are customer advances and supplier credit; third comes informal sources from other enterprises, family and friends; and last is formal finance (i.e. either bank or non-bank finance). This preliminary rank order falls in line with the pecking order theory of finance. However, sub-sector differences may indicate that some sources may play a more significant role for entrepreneurs operating in one sub-sector than for those working in another. Moreover, the array of saving channels and the different concentrations of entrepreneurs by sub-sector among these channels indicates very

important findings. Monetary savings are very important to entrepreneurs. Almost every entrepreneur has used at least one savings channel to keep her/his deposits as a means to manage liquidity of the enterprise. Moreover, entrepreneurs draw upon formal channels, commercial banks in general, as well as on informal channels, such as susu groups or collectors, to deposit their savings.

V. The Theoretical Model

The foregoing sections underscored the limited supply and range of formal financial institutions serving an enterprise clientele in Ghana. Thus, it is revealing to explore how a cross section of Ghanian enterprises finance their operations. To elucidate enterprise behavior in this world a model is presented to capture the alternative sources of finance enterpreneurs use in their businesses.

Capital structure analysis reveals important insights into the entrepreneur's choices of finance used to fund her/his operations. The financing of enterprises can be modeled by assuming a one-period world where entrepreneurs possess a certain amount of wealth to be allocated among different assets. This analysis considers an entrepreneur who knows with certainty production outcomes and all other variables in the model. The entrepreneur operates a manufacturing business where output is produced using a stock of physical capital (K) and a flow of variable inputs. Financing the vector of variable inputs used in production makes up the operating costs which add up to total expenditures (T) over the production period. The characteristics of the particular manufacturing sub-sector have a direct impact on the nature of the physical capital and variable inputs used in production. The sub-sector effect is captured by dummy variables representing the subsectors included in the study. Moreover, entrepreneurial or managerial abilities (A) are considered as an indirect input in the production function. Proxy variables, such as the characteristics of the entrepreneur and the enterprise capture the effects of entrepreneurial abilities (Table 5). The price of output (P) is exogenous and the firm's revenue function is specified as:

$$Y = Y(K, T, A, P). \qquad (1)$$

The entrepreneur augments initial wealth, or equity, (W) by drawing on external sources of financing at the beginning of the period which amount to:

$$[(1-\delta)B] \qquad 0 < \delta < 1$$

where (B) is total borrowing by the end of the production period and δ is the proportion of total borrowing that is used over the production period. Over the production period, the entrepreneur draws on (δB) to finance operating costs (T) which amount by the end of the production period to total borrowing (B). The different sources of external finance are non-commercial informal loans (IL) provided by fellow entrepreneurs, friends and relatives; trade finance from suppliers and customers (TL); and formal loans (FL) from commercial banks and other non-bank

institutions such as special microenterprise programs. The part of these liabilities (δB) is drawn upon during the production period at a continuous and constant rate to finance the operating costs (T). More specifically,

$$\delta B = \delta_1 IL + \delta_2 TL + \delta_3 FL$$

where the parameters δ_i, i=1,2,3 are associated with IL, TL and FL, respectively, $0 < \delta_i < 1$, and represent the proportion of each liability that is used to fund the operating costs.

The entrepreneur allocates the resources available to the firm [W + (1-δ)B] among financial assets (FA) and physical assets (K). The various forms of financial assets are: cash holdings (C); informal savings with moneykeepers and rotating savings and credit associations (IH); and formal deposits with commercial banks (D). Over the production period, the entrepreneur draws upon the alternative financial assets and liabilities to finance the cost of inputs. The returns (r), interest rates (i) and transaction costs (t) associated with these assets and liabilities are respectively: (r_i), (i_j) and ($t_{i,j}$), where i= C, IH, D and j= IL, TL, FL. In order for the firm to fund the rest of its operating costs (T), a part of these assets (αFA) is drawn upon at a continuous and constant rate. More specifically,

$$\alpha FA = \alpha_1 C + \alpha_2 IH + \alpha_3 D$$

where the parameter α_i, i=1,2,3 is associated with C, IH and D, respectively, $0 < \alpha_i < 1$, and represents the proportion of each asset that is used to fund the operating costs.

The firm's balance sheet constraint at the beginning of the period may be expressed as:

$$K + FA = W + (1-\delta)B \qquad (2)$$

and the flow of operating costs during the production period may be expressed as:

$$T = \alpha_1 C + \alpha_2 IH + \alpha_3 D + \delta_1 IL + \delta_2 TL + \delta_3 FL \qquad (3)$$

The returns on the financial assets and the interest rate cost of the liabilities may be expressed following the inventory theory.[5] Since the fraction of the production period during which cash is used is ($\alpha_1 C/T$), and the average cash holding during this fraction of the production period is ($\alpha_1 C/2$),[3] the total yield on cash holdings is thus:

$$r_C C - r_C[(\alpha_1 C/T)(\alpha_1 C/2)]$$

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[5] Expenditure on operating costs are assumed to occur at a constant and continuous rate during the production period.

By analogy, the total returns on financial holdings may be expressed as:

$$r(FA)=r_C C-r_C(\alpha_1 C/T)(\alpha_1 C/2)+r_{IH} IH-r_{IH}(\alpha_2 IH/T)(\alpha_2 IH/2) + r_D D-r_D(\alpha_3 D/T)(\alpha_3 D/2) \quad (4)$$

Similarly, the costs associated with the liabilities drawn upon during the production period may be expressed in a way analogous to inventory theory. Since the fraction of the production period during which informal loans are used is $(\delta_1 IL/T)$, and the average informal debt during this fraction of the production period is $(\delta_1 IL/2)$, the total cost of informal loans is thus:

$$i_{IL}(1-\delta_1)IL + i_{IL}[(\delta_1 IL/T)(\delta_1 IL/2)]$$

By the same analogy the total interest rate costs of the liabilities may be expressed as:

$$i(B)= i_{IL}(1-\delta_1)IL+i_{IL}(\delta_1 IL/T)(\delta_1 IL/2)+i_{TL}(1-\delta_2)TL+i_{TL}(\delta_2 TL/T)(\delta_2 TL/2) + i_{FL}(1-\delta_3)FL+ i_{FL}(\delta_3 FL/T)(\delta_3 FL/2) \quad (5)$$

Assuming no depreciation of physical assets during the production period, the firm's income statement would yield retained earnings (RE) as the total revenue from production and financial assets net of expenditures on operating costs, interest costs on liabilities and transaction costs associated with financial assets and liabilities t(FA, B). This may be expressed as:

$$RE = Y(K,T,A,P) + r(FA) - T - i(B) - t(FA,B) \quad (6)$$

Table 5 presents a summary of the abbreviated variable names and their definitions.

Following the standard microeconomic theory of the firm, the problem becomes one of maximization of retained earnings in the objective function with respect to the decision variables (K, T, C, IH, D, IL, TL, FL) subject to the balance sheet constraint (2) and the expenditure flow identity (3). This may be written as:

$$\text{MAX} \qquad RE = Y(K,T,A,P) + r(FA) - T - i(B) - t(FA,B) \quad (6)$$

s.t.

$$K + FA = W + (1-\delta)B \quad (2)$$

$$T = \alpha_1 C + \alpha_2 IH + \alpha_3 D + \delta_1 IL + \delta_2 TL + \delta_3 FL \quad (3)$$

$$0 \le (K, T, C, IH, D, IL, TL, FL)$$

$$0 \le \alpha_i, \delta_i \le 1$$

and given that:

$$FA = C + IH + D$$

$$(1-\delta)B = (1-\delta_1)IL + (1-\delta_2)TL + (1-\delta_3)FL$$

$$r(FA) = r_C C - r_C(\alpha_1 C/T)(\alpha_1 C/2) + r_{IH} IH - r_{IH}(\alpha_2 IH/T)(\alpha_2 IH/2) + r_D D - r_D(\alpha_3 D/T)(\alpha_3 D/2) \quad (4)$$

$$i(B) = i_{IL}(1-\delta_1)IL + i_{IL}(\delta_1 IL/T)(\delta_1 IL/2) + i_{TL}(1-\delta_2)TL + i_{TL}(\delta_2 TL/T)(\delta_2 TL/2) + i_{FL}(1-\delta_3)FL + i_{FL}(\delta_3 FL/T)(\delta_3 FL/2) \quad (5)$$

The Lagrangian for this problem is expressed as:

$$L = RE + L_1(W + (1-\delta)B - K - FA) + L_2(T - \alpha_1 C - \alpha_2 IH - \alpha_3 D - \delta_1 IL - \delta_2 TL - \delta_3 FL)$$

Differentiating with respect to the decision variables yields the first order conditions. Solving the first order condition equations for the proportions of the different sources of financing (C/T), (IH/T), (D/T), (IL/T), (TL/T) and (FL/T) for a given (T) yields the following simultaneous equations system:

$$(C/T) = f(r_C, t_C, Y_K, i_{IL}, t_{IL}, (IL/T))$$
$$(IL/T) = f(i_{IL}, t_{IL}, Y_K, r_{IH}, t_{IH}, (IH/T))$$
$$(IH/T) = f(r_{IH}, t_{IH}, Y_K, i_{TL}, t_{TL}, (TL/T))$$
$$(TL/T) = f(i_{TL}, t_{TL}, Y_K, r_D, t_D, (D/T))$$
$$(D/T) = f(r_D, t_D, Y_K, i_{FL}, t_{FL}, (FL/T))$$
$$(FL/T) = 1/\delta_3\,[1-(\alpha_1 C/T)-(\alpha_2 IH/T)-(\alpha_3 D/T)-(\delta_1 IL/T)-(\delta_2 TL/T)]$$

The empirical model that describes the proportions of the different sources of financing (C/T), (IH/T), (D/T), (IL/T), (TL/T) and (FL/T) for a given (T) yields the following simultaneous equations system:

$$\left(\frac{C}{T}\right) = \beta_{10} + \beta_{11}(t_C) + \beta_{12}(r_C) + \beta_{13}(i_{IL}) + \beta_{14}(t_{IL}) + \beta_{15}\left(\frac{IL}{T}\right) + \beta_{16}(Y_K) \quad (7)$$

$$\left(\frac{IL}{T}\right) = \beta_{20} + \beta_{21}(t_{IL}) + \beta_{22}(i_{IL}) + \beta_{23}(r_{IH}) + \beta_{24}(t_{IH}) + \beta_{25}\left(\frac{IH}{T}\right) + \beta_{26}(Y_K) \quad (8)$$

$$\left(\frac{IH}{T}\right) = \beta_{30} + \beta_{31}(t_{IH}) + \beta_{32}(r_{IH}) + \beta_{33}(i_{TL}) + \beta_{34}(t_{TL}) + \beta_{35}\left(\frac{TL}{T}\right) + \beta_{36}(Y_K) \quad (9)$$

$$\left(\frac{TL}{T}\right) = \beta_{40} + \beta_{41}(t_{TL}) + \beta_{42}(i_{TL}) + \beta_{43}(r_D) + \beta_{44}(t_D) + \beta_{45}\left(\frac{D}{T}\right) + \beta_{46}(Y_K) \quad (10)$$

$$(\frac{D}{T}) = \beta_{50} + \beta_{51}(t_D) + \beta_{52}(r_D) + \beta_{53}(i_{FL}) + \beta_{54}(t_{FL}) + \beta_{55}(\frac{FL}{T}) + \beta_{56}(Y_K) \quad (11)$$

The objective of this model is to examine the capital structure of the firm using the structural system of simultaneous equations that accounts for the endogeneity of financial contracts in different sub-sectors.

VI. Econometric Methods and Analysis

The allocations of financial assets and liabilities used to finance the firm's operating costs for a given period are jointly determined in a structural system of simultaneous equations (eqs. 7-11). The empirical model that is derived from the general structural simultaneous equations system involves the observed amounts of financial assets and liabilities used to finance the operating costs for a given period. The array of different financing sources that an entrepreneur may use to fund total expenditures represents some zero and non-zero amounts for the variables (C/T, IL/T, IH/T, SL/T, D/T, FL/T) on the left hand side (LHS) of the equations in the model. The sequential two-stage estimation technique used in the study involves, first, estimating the reduced form equations using the standard tobit model for equations with limited LHS variables or least squares for unconstrained LHS variables, as appropriate for each reduced form equation (Table 6). Second, we obtain the predicted values of the endogenous variables from step 1, and insert the predictors for the endogenous variables on the RHS of the equations in the structural model. Third, we estimate the structural equations using the tobit maximum likelihood technique or least squares to generate the results of the model presented in table 7. This methodology is similar to that used in Nelson and Olson's model (1978), reviewed by Amemiya (1984) under a type 4 tobit model, which generates consistent and asymptotically normal estimates.

Implications of the Model

Tables 6 and 7 highlight the findings of the model in Ghana. First, larger asset holdings (K) are negatively associated with informal holdings (Table 7, column 3). This result is expected since larger investments in physical capital are associated with carrying smaller amounts of informal holdings. However, the long-term effects as indicated from the reduced form equations in table 6, imply, as expected, that a larger value of physical assets (K), a proxy for collateral, is associated with increases in formal loans as a proportion of total expenditure (Table 6, column 6). Formal lenders often use collateral to screen borrowers and resolve part of their asymmetric information problems. On the other hand, larger amounts of informal holdings, trade loans and formal deposits, are associated with increases in profitability (P/T) (Table 7, columns 3,4 &5). This implies that entrepreneurs engaged in more profitable activities hold larger amounts of informal and formal deposits, since they are able to generate more earnings, and acquire larger amounts of trade finance from suppliers and customers.

Larger enterprises, proxied by the number of employees (EMPLY), are associated with using smaller amounts of cash and smaller amounts of informal loans and formal deposits because they find the opportunity cost of idle cash high (Table 7, columns 1,2 &5). However, the reduced form equations surprisingly indicate that formal loans decrease with increases in the size of the enterprise (Table 6, column 6), implying that the long-term effect for large enterprises is to use less debt financing, a finding consistent with the pecking order theory. Increases in informal loans and informal holdings are negatively associated with increases in the age of the business (YRS) (Table 7, columns 2 &3). However, the long-term effects indicate that formal deposits increase with increases in the age of the business (Table 6, column 5).

Sub-sector differences indicate that entrepreneurs operating furniture (CRP), tailoring (TLR) and carving (CRV) workshops are positively associated with having larger amounts of formal deposits as a proportion of total expenditure than entrepreneurs operating bakeries indicating a larger demand for savings (Table 7, column 5). Entrepreneurs engaged in furniture manufacturing also draw upon trade finance to a larger extent than entrepreneurs operating in the other subsectors (Table 7, column 4). This finding may be explained by the large observed amounts of customer advances flowing to furniture workshops and trade credit offered to carpenters versus the more limited amounts of customer advances or supplier credit that tailors, bakers or carvers use. On the one hand, carvers and carpenters use more informal loans than other entrepreneurs (Table 7, column 2), while on the other hand, carpenters and tailors use more cash than other entrepreneurs (Table 7, column 1).

Among the characteristics reflecting entrepreneurial abilities, age of the entrepreneurs (AGE) indicates that older entrepreneurs use more informal loans and informal holdings compared to younger entrepreneurs (Table 7, columns 2 & 3). The long-term effects indicate also, that older entrepreneurs tend to use more retained earnings than younger entrepreneurs (Table 6, column 1). These findings imply that older entrepreneurs use safer sources of financial assets such as internal and informal finance as suggested in the pecking order theory. Education (EDUC) coefficients indicate that more educated entrepreneurs use more cash or retained earnings and informal holdings and less trade loans as a proportion of total expenditure than less educated entrepreneurs (Table 7, column 1,3 & 4). This is contrary to expectation because more educated entrepreneurs are presumed to be better informed and able to access external finance easily. However, this finding is in line with the pecking order theory which suggests that entrepreneurs choose safer sources of finance first. Over the long run, more educated entrepreneurs hold more formal deposits than less educated entrepreneurs (Table 6, column 5). Increases in the number of years of the entrepreneur's previous experience (XEXP) is associated with using less cash and more informal loans (Table 7, column 1 & 2). Finally, gender of the entrepreneur (GENDER) indicates that female entrepreneurs have larger amounts of formal deposits with formal institutions than male entrepreneurs indicating a more risk averse behavior (Table 7, column 5).

The rates of return on informal and formal deposits are positively associated with higher holdings of these financial assets. However, the interest rates on financial liabilities do not seem to have a significant effect except for trade loans where the relationship is positive, contrary to

expectation, but of a small magnitude. Transaction costs are generally positively associated with the respective amounts of financial assets and liabilities; however, the magnitude of these effects are relatively small.

Finally, there are two significant relationships among the financial assets and liabilities. First, increases in informal holdings are positively associated with increases in informal loans (Table 7, column 2) and, second, increases in deposit holdings are negatively associated with increases in formal loans as a proportion of total expenditure (Table 7, column 5). The first relationship indicates that entrepreneurs may complement the use of internal sources of financing with safe sources of external finance. This relationship is in agreement with the pecking order theory which suggests the use of internal sources of financing or safe sources of external finance rather than drawing on risky sources of external finance. Second, the relationship between formal deposits and formal loans implies that entrepreneurs would draw more on internal sources of finance, i.e. deposits, and less on risky sources of external finance, i.e. formal loans. This inverse relationship is also in agreement with the pecking order theory which implies these two sources are substitutes rather than complements.

VII. Summary and Conclusions

The objective of this study was to analyze the differences in the sources of finance used by non-farm manufacturing enterprises in low income countries. The study advanced a theoretical model to analyze how various sources of finance simultaneously determine the capital structure of the firm. The model presented in this study extends the standard capital structure analysis by incorporating financial transactions as endogenous factors within the model of financial structure. More specifically, the model examines the entrepreneurs' choice of the capital structure of the firm by deriving a structural system of simultaneous equations accounting for the endogeneity of financial contracts in different sub-sectors. The study presents empirical implications based on a study of four sub-sectors in Ghana.

The characteristics of the subsector within which an entrepreneur operates make a significant difference in the sources of finance that individual enterprises utilize. On the one hand, trade credit is an important source of finance for enterprises that demand and purchase inputs from suppliers willing to sell on credit, and for those enterprises that manufacture custom-made products, such as metal and wood products and tailoring, where customers pay in advance for their orders. On the other hand, informal savings with informal moneykeepers and susu collector and formal deposit holdings are significant sources of finance in the traditionally female profession of tailoring and bakeries. The subsector of operation does not seem to affect the entrepreneurs' use of formal loans directly, although entrepreneurs with larger assets, such as modern bakeries, are associated with using more formal loans.

These results are important because they show that if enterprises are profitable, have a large number of employees, draw on competing sources of input supplies or customer demand and are operated by entrepreneurs who have a large amount of experience, they would use more internal and informal sources of finance and less formal finance. The use of informal financial services, such as informal holdings, is positively associated with the use of informal loans. The use of formal finance, however, remains the domain of entrepreneurs who can provide more information, such as a higher value of working assets, a proxy for collateral, that reduces asymmetry problems for formal institutional lenders.

The relevance of the pecking order theory raises serious questions about the cost effectiveness of allocating large amounts of resources into expensive microenterprise programs in LICs. Trade liberalization policies may have a more positive impact on increasing competition among input suppliers and opening new channels for sale of output in expanded markets. Intervention schemes should focus on enhancing vertical linkages and output marketing channels that in turn would generate a larger demand for microenterprise products. Financial programs and liberalization policies should further stress savings mobilization and induce more competition in financial markets between formal and informal intermediaries.

Improving formal finance, which is the emphasis of most policies, would be of benefit to all creditworthy firms. But the small size and limited collateral capacity of many firms in the sample suggest that only a few firms will obtain this source of finance. Therefore, informal finance is likely to continue to be important. Trade finance is among the most significant sources of finance in the manufacturing sector. Traders sell inputs to small enterprises on credit and customers sub-contract small enterprises to deliver custom-made products. If formal intervention schemes are necessary, then providing support through strategic input suppliers in these subs-sectors may be the most efficient method to reach small enterprises.

Table 1. Selected Monetary Indicators for Ghana 1983-93.

	1983 (1)	1988 (2)	1990 (3)	1992 (4)	1993 (5)
A. Monetary and Economic Indicators					
M2/GDP	11 33	14 75	13.37	17.48	16.83
Reserve Ratio	40 82	40.25	25.97	18.21	n.a.
Real Dep. Rate	-54.12	-11.3	-20.0	5.68	-1.08
Real Lending Rate	-13 3	-4 4	11.6	12.4	n.a.
Rate of Inflation	123.02	31.48	37.25	10.05	24.95
Growth Rate of GDP	0.70	5.62	3.32	3.89	4.8
B. Private Banking Sector Measures					
Loans/Deposits	n.a.	55.99	39.86	n.a.	29.51
Loans/Assets	n.a.	40.19	29.35	n.a.	19.20
Investments/Assets	n.a.	9.19	14.56	n.a.	32.03

Source: International Financial Statistics, selected years., *Financial Markets in Ghana: The Banking Industry, Non-Bank Financial Institutions and Enterprise Finance, A Report to the USAID Mission, Accra, Ghana,* Mayada M. Baydas and Douglas H. Graham, The Ohio State University, 1994.

Table 2. Current Funding Sources Reportedby Entrepreneurs in the Enterprise Survey by Sub-sector.

GHANA

	Textile & Tailoring (1)	Furniture Workshops (2)	Artisanal Wood-Crafts (3)	Bakeries (4)	Total (5)
Sources of Funds for Current Operations					
Entrepreneurs Using Retained Earnings (Cash)	88%	93%	100%	91%	93%
Entrepreneurs Using Informal Loans	33%	53%	61%	37%	45%
Entrepreneurs Using Trade Credit (Supplier/Customer)	75%	95%	85%	83%	84%
Entrepreneurs Using Formal Loans	19%	30%	44%	0%	22%
Savings Channels					
Share of Sample Entrepren. with Deposits in Formal Institution	73%	78%	63%	25%	59%
Entrepreneurs Participating in Informal Groups	17%	8%	10%	11%	11%
Entrep. Saving with Susu Collectors or Money-Guards	12%	0%	2%	13%	7.5%

Source: OSU Enterprise Survey, 1993.
Note: % corresponds to percentage of sample within a sub-sector or for all enterprises in the survey.

Table 3. Share of Enterprises using the various sources of Finance by Size Category (Current Number of Employees).

	Micro(<5)	Small (5-29)	Med. (30-99)	Large(>100)
	(1)	(2)	(3)	(4)
Number of Enterprises	102	48	11	9
Source of Finance				
Retained Earnings	97%	94%	100%	33%
Informal Loans	48%	40%	55%	44%
Informal Holdings	9%	23%	0%	0%
Trade Loans	84%	85%	73%	89%
Formal Deposits	45%	73%	100%	100%
Formal Loans	16%	15%	73%	89%

Source: OSU Enterprise Survey, 1993.

Table 4. Share of Enterprises using the various sources of Finance by Years of Operation.

Number of Years	1-2 Yrs.	3-5 Yrs.	6-10 Yrs.	11-20 Yrs.	>20 Yrs.
	(1)	(2)	(3)	(4)	(5)
Number of Enterprises	23	45	30	43	29
Source of Finance					
Retained Earnings	100%	100%	97%	89%	79%
Informal Loans	65%	44%	60%	40%	28%
Informal Holdings	17%	11%	13%	9%	11%
Trade Loans	87%	82%	83%	84%	86%
Formal Deposits	52%	62%	63%	54%	66%
Formal Loans	9%	13%	36%	24%	35%

Source: OSU Enterprise Survey, 1993.

Table 5. Definition of Variables in the Simultaneous Equations Model of the Different Sources of Financing Shares Relative to Total Expenditures

Variables	Definition
Exogenous Variables	
K	Physical assets (Cedis);
P	Total value of output (Cedis);
T	Total cost of inputs (Cedis);
EMPLY	Number of employees;
YRS	Number of years the enterprise has been in operation;
CRV	Dummy variable = 1 for wood-carvers;
CRP	Dummy variable = 1 for carpenters;
BKR	Dummy variable = 1 for bakeries;
TLR	Dummy variable = 1 for tailoring workshops;
AGE	Age of the entrepreneur (Years);
EDUC	Educational level of the entrepreneur;
XEXP	Number of years of previous experience in line of business;
GENDER	Dummy variable = 1 for male entrepreneurs;
RC	Rate of return on cash holdings;
IIL	Interest rate on informal loans;
RIH	Rate of return on informal savings;
ITL	Interest rate on trade loans;
RD	Rate of return on deposits;
IFL	Interest rate on formal loans;
TCC	Transaction costs associated with cash holdings (Km);
TCIL	Transaction costs associated with informal loans (Km);
TCIH	Transaction costs associated with informal savings (Km);
TCTL	Transaction costs associated with trade loans (Cedis);
TCD	Transaction costs associated with deposits (Km);
TCFL	Transaction costs associated with formal loans (Km);
Endogenous Variables	
CT	Cash holdings relative to total cost of inputs;
ILT	Informal loans relative to total cost of inputs;
IHT	Informal savings relative to total cost of inputs;
TLT	Trade loans relative to total cost of inputs;
DT	Deposits relative to total cost of inputs;
FLT	Formal loans relative to total cost of inputs.

Table 6. Reduced Form Equations of the Different Sources of Financing Relative to Total Expenditure Results in Ghana (Linear-Log Functional Form).

Variables	OLS (CT)	TOBIT (ILT)	TOBIT (IHT)	TOBIT (TL/T)	TOBIT (DT)	TOBIT (FLT)
	(1)	(2)	(3)	(4)	(5)	(6)
Const.	-	- **	- ***	+ **	+ **	-
LK	-	-	- **	-	-	+ ***
LPT	+	-	+ **	+ ***	+	+
LEMPLY	- **	- **	+	+	-	- **
LYRS	-	-	- *	+	+ *	+
CRV	-	+	-	+	+ **	+
CRP	+ **	+ *	-	+ ***	+ ***	+
TLR	+ *	+ **	-	+	+ ***	+
LAGE	+ *	+ **	+ **	-	-	+
LEDUC	+ **	+	+ ***	- ***	+ ***	- *
LXEXP	-	+ *	-	+	-	+
GENDER	+	-	+	+	-	-
LRC	+	+	-	-	+	- **
LIIL	+	+ ***	-	-	+	+
LRIH	+ *	-	+ ***	-	-	-
LITL	-	-	-	+	+ *	-
LRD	-	-	+	- **	+ **	-
LIFL	+	+	+	-	+ ***	+ ***
LTCC	-	-	+	+	-	+ *
LTCIL	+	+ ***	-	-	- ***	- *
LTCIH	+	+	-	+	+ **	-
LTCTL	- ***	-	+ *	+ **	- *	+
LTCD	-	+	+ *	- *	+	+
LTCFL	-	+	-	+	+ ***	+ *
R-SQR	0.38					
LH		-24.86	0.49	-179.54	-23.81	-23.77

***, ** & * represent significance at 1, 5 and 10 percent levels, respectively.

Table 7. Second-Stage Structural Equation Estimation of the Different Sources of Financing Relative to Total Expenditure Results in Ghana (Linear-Log Functional Form).

Variables	OLS (CT)	TOBIT (ILT)	TOBIT (IHT)	TOBIT (TL/T)	TOBIT (DT)
	(1)	(2)	(3)	(4)	(5)
Const.	-0.160	-5 233 ***	-10 231 *	2 755 **	-1.846
	(0.462)	(1 774)	(6.502)	(1 543)	(1.586)
LK	-0 011	-0 022	-0.584 **	-0 027	0.689
	(0.017)	(0 069)	(0.307)	(0.062)	(0.077)
LPT	0.017	-0.015	0.591 *	0 308 ***	0.158 *
	(0 025)	(0.109)	(0.416)	(0.097)	(0.097)
LEMPLY	-0 051 *	-0.305 **	0.247	0.050	-0.238 **
	(0.036)	(0 134)	(0.368)	(0 118)	(0.127)
LYRS	0.042	-0.193 *	-0.635 *	0.069	0.099
	(0.037)	(0.149)	(0.391)	(0 136)	(0.155)
CRV	-0.119	0 689 *	-1.855	0.159	1.977 ***
	(0.136)	(0.503)	(1.539)	(0.522)	(0.539)
CRP	0.259 **	0.833 **	-1.298	1.247 ***	1.552 ***
	(0.122)	(0.470)	(2.190)	(0.484)	(0.444)
TLR	0.199 **	0.955	-1.269	0.290	1.444 ***
	(0.107)	(0.350)	(1.062)	(0.398)	(0.353)
LAGE	0.148	1.289 ***	2.975 **	-0.540	0.007
	(0.140)	(0.513)	(1.485)	(0.437)	(0.466)
LEDUC	0.060 **	0.148	0.992 **	-0.297 ***	0.159
	(0.034)	(0.146)	(0.597)	(0.126)	(0.145)
LXEXP	-0.048 *	0.185 *	-0.415	0.007	0.027
	(0.034)	(0.119)	(0.389)	(0.104)	(0.111)
GENDER	0.079	-0.119	0.363	0.231	-0.687 **
	(0.084)	(0.354)	(0.916)	(0.322)	(0.315)
LRC	0.2E-02				
	(0.038)				
LIIL	-0.057	0.440 ***			
	(0.055)	(0.136)			
LRIH		0.184	1.449 ***		
		(0.227)	(0.253)		
LITL			-0.399	0.139	
			(0.402)	(0.124)	
LRD				-0.363 *	0.622 ***
				(0.255)	(0.199)
LIFL					0.119
					(0.119)
LTCC	-0.019				
	(0.019)				
LTCIL	-0.069	0.464 ***			
	(0.055)	(0.099)			
LTCIH		0.018	-0.404		
		(0.303)	(0.334)		
LTCTL			0.086	0.076 **	
			(0.154)	(0.035)	
LTCD				-0.075	0.344 ***
				(0.098)	(0.073)
LTCFL					0.111
					(0.153)
ILHAT	1.224				
	(0.951)				
IHHAT		3.125 *			
		(2.101)			
TLHAT			-0.495		
			(1.992)		
DHAT				-0.464	
				(1.294)	
FLHAT					-1.867 **
					(0.996)
R-SQR	0.28				
LH		-25.38	-2.22	-180.01	-34.47
CHI-SQR		47.70	51.42	51.65	69.98

Asymptotic standard errors are reported in parentheses.
***, ** & * represent significance at 1, 5 and 10 percent levels, respectively.

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